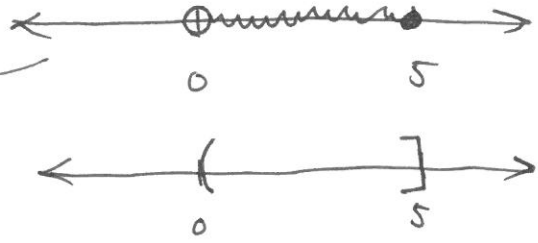
MA141 - 012

Monday, August 27



$(0, 5]$ $\quad \mathbb{R}$




$(3, \infty)$



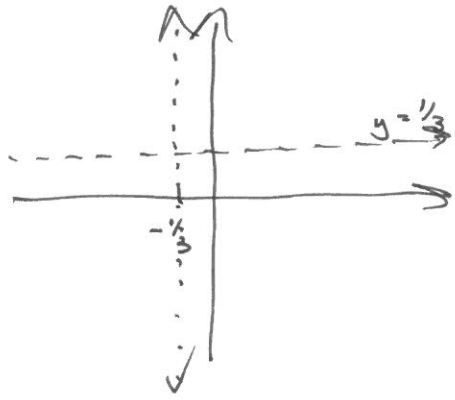

$(-\infty, 5]$

find the DOMAIN: $x \neq -1/3$

$(-\infty, -1/3) \cup (-1/3, \infty)$

find the RANGE:

$$f(x) = \frac{1 \cdot x - 5}{3x + 1}$$ ✓




vertical asymp: $x = -1/3$

horizontal asymp: $y = 1/3$

$$\frac{x-5}{3x+1} \overset{?}{=} \frac{1}{3}$$

$$3(x-5) = 1(3x+1)$$

$$3x - 15 = 3x + 1$$

$$\lim_{x \to \infty} \frac{x-5}{3x+1}$$

$$\lim_{x \to -\infty} \frac{x-5}{3x+1}$$

$f^{-1}(x) = ???$

$f(x) = \dfrac{x-5}{3x+1}$ $\qquad y = \dfrac{x-5}{3x+1}$

find $f^{-1}(x)$:

(1) switch $x$ & $y$:

$$\frac{x}{1} = \frac{y-5}{3y+1}$$

(2) solve for $y$:

$$x(3y+1) = y-5$$
$$3xy + x = y-5$$
$$3xy - y = -x-5$$
$$y(3x-1) = -x-5$$
$$y = \boxed{\frac{-x-5}{3x-1} = f^{-1}(x)}$$

vert asymp: $x = 1/3$ ✓
horiz asymp: $y = -1/3$ ✓

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$4^0 = 1$ $\qquad \dfrac{4^3}{4^3} = 4^{3-3} = 4^0 =$

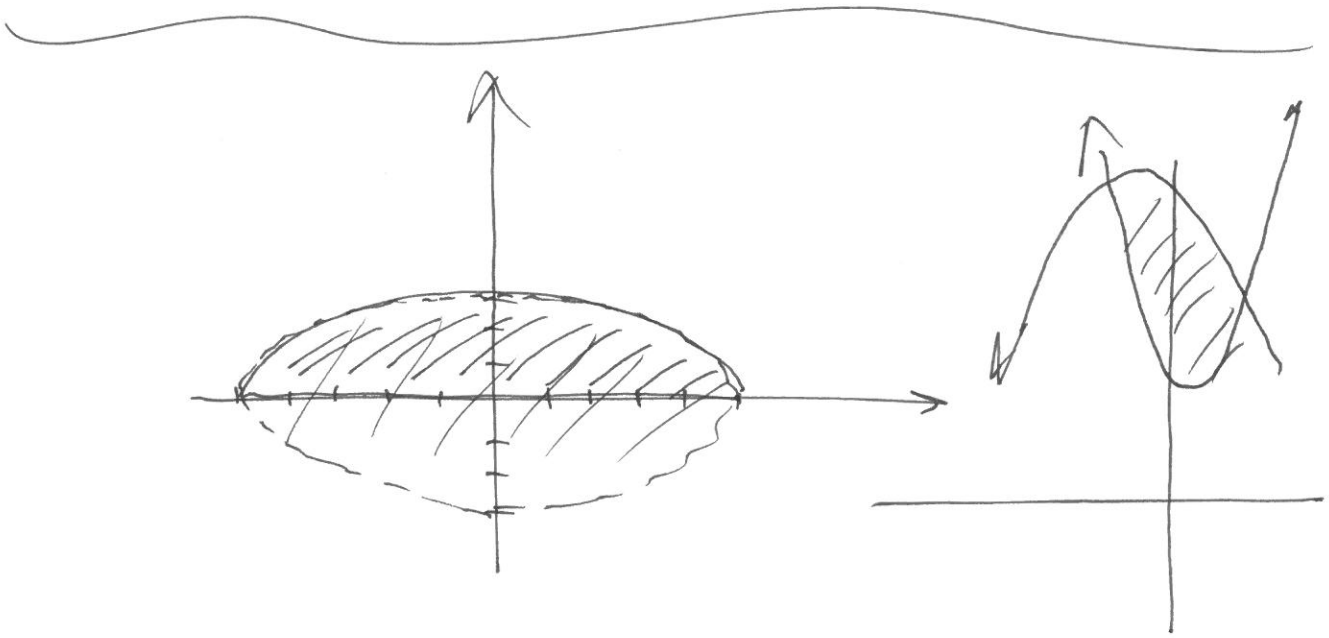
$0^0 \overset{??}{=} 1$ $\qquad \dfrac{0^3}{0^3} = 0^{3-3} = 0^0 = \underline{??????}$

$a^{2/3} = \left(\sqrt[3]{a}\right)^2$

$\left(a^{1/3}\right)^2$ $\quad \sqrt[3]{(a^2)}$

$(a^2)^{1/3}$

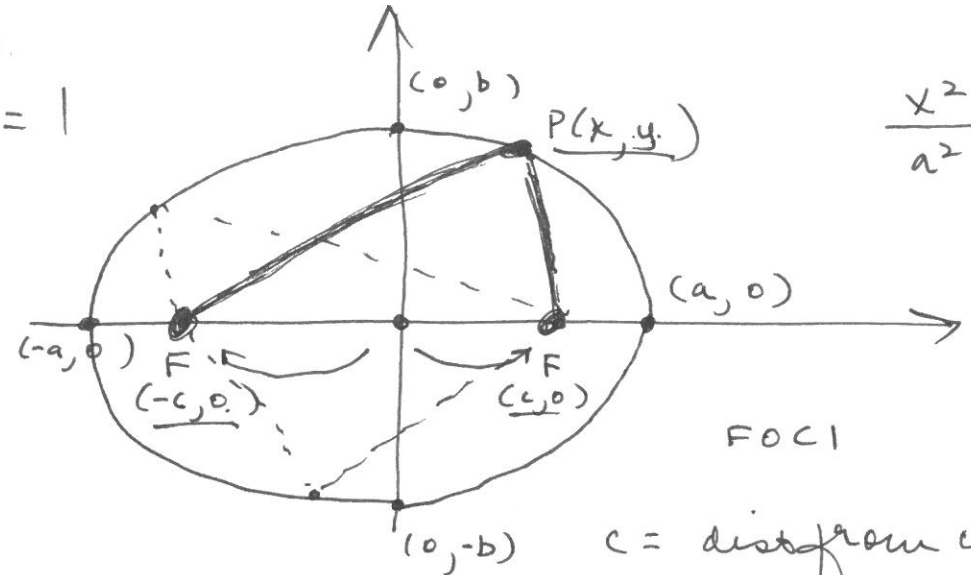
resume: 7:06



$\frac{x^2}{a^2} + \frac{0^2}{b^2} = 1$

$\frac{x^2}{a^2} = 1$

$x = a, -a$




$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

$a^2 = b^2 + c^2$

FOCI

$\frac{0^2}{a^2} + \frac{y^2}{b^2} = 1$

$\frac{y^2}{b^2} = 1$

$y = \pm b$

c = dist from center to foci

$$\sqrt{(x+c)^2+y^2} + \sqrt{(x-c)^2+y^2} = 2a$$

$$\left[\sqrt{(x+c)^2+y^2}\right]^2 = \left[2a - \sqrt{(x-c)^2+y^2}\right]^2$$

$$(x+c)^2 + y^2 = 4a^2 - (2a)(2)\sqrt{(x-c)^2+y^2} + (x-c)^2 + y^2$$

$x^2 + 2cx + c^2$ $\qquad$ $x^2 - 2cx + c^2$

$+2cx$

$$4cx = 4a^2 - 4a\sqrt{(x-c)^2+y^2}$$

$$cx = a^2 - a\sqrt{(x-c)^2+y^2}$$

$$\left[a\sqrt{(x-c)^2+y^2}\right]^2 = \left[a^2 - cx\right]^2$$

$$a^2\left[(x-c)^2+y^2\right] = a^4 - 2a^2cx + c^2x^2$$

$\vdots$

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

$a^2 = b^2 + c^2$

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \qquad (a^2 = b^2)$$

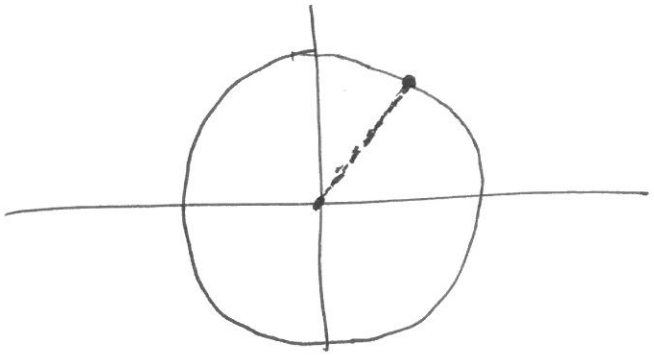
$$\frac{x^2}{a^2} + \frac{y^2}{a^2} = 1$$

$$x^2 + y^2 = a^2 \qquad (x^2 + y^2 = r^2)$$

circle (still ellipse)

circle; center $(0,0)$

radius $= r$



ex: $\frac{x^2}{16} + \frac{y^2}{9} = 1$

$a^2$

$a = 4$

$2a = 8$

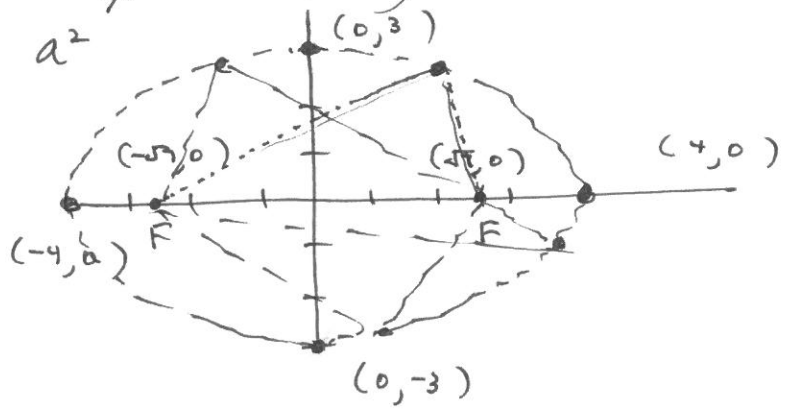
$a^2 = b^2 + c^2$

$(a^2 > b^2)$

$16 = 9 + c^2$

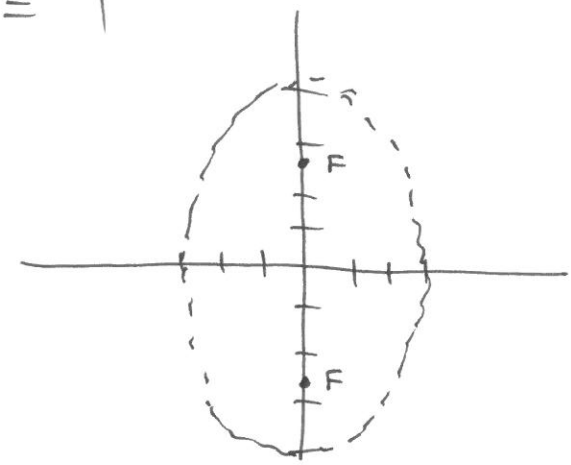
$c^2 = 7$

$c = \pm\sqrt{7}$



$$\frac{(x-0)^2}{9} + \frac{(y-0)^2}{16} = 1$$

$b^2$ $\quad$ $a^2$

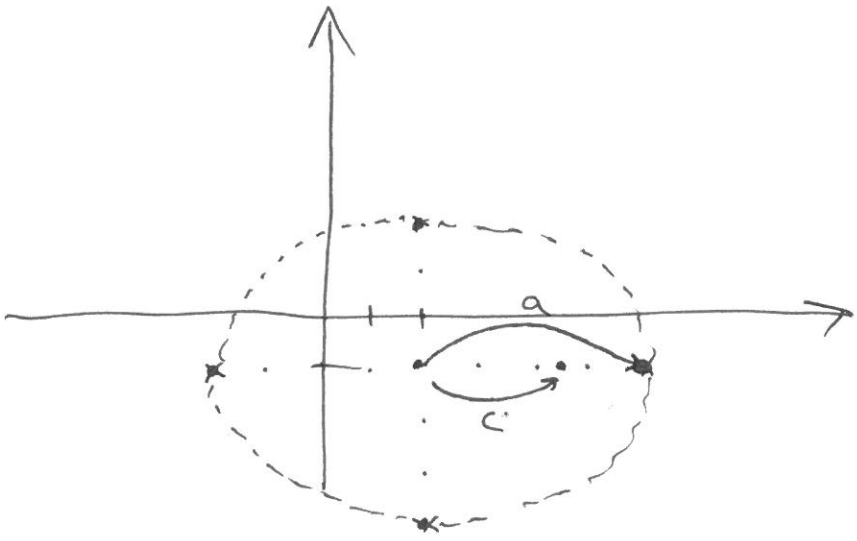



$$\frac{(x-h)^2}{b^2} + \frac{(y-k)^2}{a^2} = 1$$

$$\frac{(x-2)^2}{16} + \frac{(y+1)^2}{9} = 1$$

$a^2 = b^2 + c^2$

center $(2, -1)$



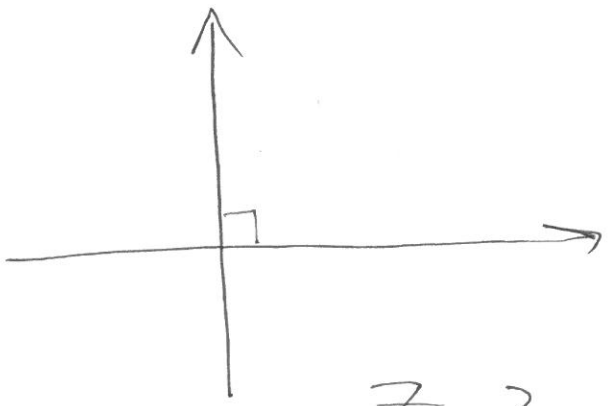
$$\frac{(x-2)^2}{16} - \frac{(y+1)}{9} = 1$$

MA141 - 012

Wednesday, August 22

1. calculators
2. DSO tests (same day)
3. webassign codes / book
4. LAPTOPS - notes
5. Tutor?

$2+3i$ $\quad a \pm bi$



$(\mathbb{R}, \mathbb{R})$

$\not\equiv$

$\mathbb{Z}_2$

$\frac{8}{4} = 2$ (check: $2 \cdot 4 = 8$)

$\frac{0}{5} = 0$ (check: $0 \cdot 5 = 0$)

$\frac{4}{0} = \alpha$ (check: $\alpha \cdot 0 \stackrel{?}{=} 4$)

$\frac{0}{0} = 143$ (check: $11 \cdot 0 = 0$)

(check: $14 \cdot 0 = 0$)

Infinite # of solutions

$$\lim_{x \to 0} \frac{7x}{x} = \frac{7}{1} = 7$$

**MA 141 - 012** **FALL 2017** **6:00 – 7:50 pm** **M W** **SAS1102**

**Instructor**: Dr. John Griggs **Office**: SAS 2107 **Phone**: 513-2291 **E-mail**: jrgriggs@ncsu.edu
**Office hours**: 1:15 – 2:45 T Th, and by appt **Textbook**: Calculus I for Engineers and Scientists, by Franke, Griggs, and Norris (on-line textbook accessible via WebAssign (under **Resources**); $45)
**TA** (recitation leader; MA141-012A,B,C): Caprice Stanley (crstanl2@ncsu.edu)

**Goals and Objectives**: Recognize and graph equations for conic sections and for parametric equations. Conceptual and visual representation of limits, continuity, differentiability, and tangent line approximation for functions at a point. Apply the limit theorems, the squeeze theorem, left and right limits, and limits involving infinity using L'Hopital's Rule. Approximate roots of an equation using the Intermediate Value Theorem and Newton's Method. Apply the power rule, product rule, quotient rule, and the chain rule to functions explicitly and implicitly for finding derivatives. Use derivatives in practical applications, such as distance, velocity, acceleration and related rates. Use first and second derivatives to optimize functions and to find critical numbers, inflection points, extreme points, and the shape of the graph. Sketch a possible graph of a function given the graph of its derivatives. Antidifferentiate basic functions, use Riemann sums to estimate areas under the curve, and apply the Fundamental Theorem of Calculus to evaluate definite integrals. Examine a variety of patterned integration techniques.

**Grading**: **60% Tests; 15% Homework/Quiz; 25% Final exam:** the +/- system will be used: 98 - 100 A+; 92-97 A; 90-91 A-; 89-89 B+; 82-87 B; 80-81 B-; 78-79 C+; 72-77 C; 70-71 C-; 68-69 D+; 62-67 D; 60-61 D-; 0-59 F

**Absences**: No penalty for excessive absences; the reward for good attendance (4 absences or fewer) is the opportunity to replace your worst test grade with the final exam, if it is higher. (sleeping = absent) Tardies and early departures will accrue into absences. Students who are tardy should enter as quietly as possible so as not to distract the class that has already begun. If attendance has already been taken, it is your responsibility to see me at the front of the classroom after class to have your absence changed to a tardy.

**Homework/Quiz**: (Webassign homeworks; in-class quizzes) Webassign homework deadline extensions can be done by the student (self-extensions; reduced point value for the assignment). You must purchase access to webassign; use the website at the bottom of this sheet. The fee includes the webassign homework and the on-line textbook.

Students with **documented disabilities** (through NCSU's DRO) will be given all necessary accommodations. Instructor must have paperwork well before testing begins.

All tests will be taken in blue books. Students should turn in 6 blue books (no names on them) to me prior to test one. Blue books can be obtained at the student bookstores – many times they are free; they are at most $.15 each. A stamped-blue book (two blue books for the exam) will be issued to you each test day.

**Academic Integrity Statement**: Academic dishonesty includes the giving, taking, or presenting of information or material by a student with the intent of unethically or fraudulently aiding oneself or another person on any work which is to be considered in the determination of a grade or the completion of academic requirements. More specific definitions are set in the NCSU Code of Student Conduct. The honor pledge: "I have neither given nor received unauthorized aid on this test or assignment."

**Final Exam**: Monday, December 17, 6:00 - 9:00 pm SAS1102 or
(alternate final exam date: Saturday, December 15 8:00 – 11:00 am SAS1102)
**J. Griggs' homepage** : **http://www4.ncsu.edu/~jrgriggs**
**Webassign homepage: http://webassign.ncsu.edu**